

# Notice of Allowability

Application No.

10/029,278

Examiner

Sudhanshu C. Pathak

Applicant(s)

ROH, DONG WOOK

Art Unit

2634

## -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to October 6<sup>th</sup>, 2005.
2. ☒ The allowed claim(s) is/are 1-14 and 16-26.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date October 20<sup>th</sup>, 2005.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### DETAILED ACTION

1. Claims 1-14 & 16-26 are pending in the application.
2. Claim 15 has been canceled.

### EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Daniel Y.J. Kim on October 20<sup>th</sup>, 2005.

- In order to avoid a 112 2<sup>nd</sup>, Paragraph rejection the claims have been amended as follows:

➤ In claim 4, **after** line 2 **insert**

"wherein:

$L_{IFW}$  is the length of the interference free window

$g$  is a natural number"

➤ In claim 5, **after** line 8 (after the last line) **insert**

"wherein:

$L_{GUARD}$  is the length of guard component

$g$  &  $m$  are natural number(s)

$K$  is an integer

$N$  is the code length"

- In claim 8, after line 8 (after the last line) insert

“wherein further:

k is an integer”

- In claim 19, line 8 (second to last line) replace

“.....wherein “l” is an orthogonal code.....” with

“.....wherein “l<sub>i</sub>” is an orthogonal code.....”

- In Claim 21 Eq. 2 replace

“L” with

“L<sub>i</sub>”

- In Claim 21, line 11 (after Eq. 2) insert

“wherein “m” and “g” are natural numbers”

- In Claim 22, after line 17 insert

“wherein:

“m” and “g” are natural numbers

“k” and “j” are integers

L<sub>GUARD</sub> is the length of guard component

L<sub>IFW</sub> is the length of the interference free window”

- In Claim 23, after Eq. 2 insert

“wherein “m” and “g” are natural numbers”

- In Claim 25, after line 20 insert

“wherein:

“m” and “g” are natural numbers

"k" and "j" are integers

$L_{\text{GUARD}}$  is the length of guard component

$L_{\text{IFW}}$  is the length of the interference free window"

➤ In Claim 26, after Eq. 2 insert

"wherein "m" and "g" are natural numbers"

***Allowable Subject Matter***

4. Claims 1-11 & 18-21 are allowed.

Claims 1-11 & 18-21 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method for allocating code pairs of **orthogonal spreading codes having guard bits of 0**, comprising: generating at least one orthogonal code set based upon the orthogonal spreading codes; determining one of the at least one orthogonal code set as a representative orthogonal code set; and allocating an order of code pairs according to a prescribed rule based upon the representative orthogonal code set.

5. Claims 12-13 are allowable.

Claims 12-13 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method for generating an orthogonal code set using orthogonal spreading codes, comprising: generating orthogonal spreading codes corresponding to a prescribed code length; **adjusting** an interval of a length of an interference free window (IFW) **based** upon a prescribed code component length; and generating at least one

orthogonal code set based upon the orthogonal spreading code **if** the length of the IFW interval is adjusted.

6. Claim 14 is allowable.

Claim 14 is allowable over the prior art of record because the cited references do not contain the specified limitation of a method for allocating code pairs using orthogonal spreading codes, comprising: determining one of at least one orthogonal code set as a representative orthogonal code set' allocating different orthogonal spreading codes to an I branch and a Q branch, and determining whether to minimize a peak-to-average power ratio; generating at least one code pair based upon the representative orthogonal code set according to whether the code pair for minimizing a peak-to-average power ratio is allocated; generating a code pair set based upon the at least one code pair; and allocating a code order based upon the at least one code pair included in the code pair set, **wherein the code pair is generated on the basis of a center of at least one element of the representative orthogonal code set wherein the at least one element is arrayed in an ascending order.**

7. Claim 16 is allowable.

Claim 16 is allowable over the prior art of record because the cited references do not contain the specified limitation of a method for allocating code pairs using orthogonal spreading codes, comprising: determining one of at least one orthogonal code set as a representative orthogonal code set allocating different orthogonal spreading codes to an I branch and a Q branch, and determining

whether to minimize a peak-to-average power ratio; grouping at least one code pair set according to a prescribed rule based upon the representative orthogonal code set in accordance with whether the code pair for minimizing a peak-to-average power ratio is allocated; selecting a code pair set from the at least one code pair according to a prescribed order; generating at least one code pair **based on a center of at least one element of the representative orthogonal code set and** at least one element included in the selected code pair set; and allocating a code order based upon the at least one code pair.

8. Claim 17 is allowable.

Claim 17 is allowable over the prior art of record because the cited references do not contain the specified limitation of a method for allocating code pairs using orthogonal spreading codes, comprising: determining one orthogonal set of at least one orthogonal code set as a representative orthogonal code set; determining whether to identically allocate the same orthogonal spreading code to an I branch and a Q branch; generating at least one code set by using the orthogonal code set according to whether different orthogonal spreading codes are to be allocated to an I component and a Q component; selecting the at least one code set in a prescribed order; and allocating a code order according to a prescribed rule based upon at least one element of the selected code set **wherein the at least one element is arrayed in an ascending order.**

9. Claims 22 & 25 are allowable.

Claims 22 & 25 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method (and apparatus) to generate orthogonal code sets, comprising: selecting a code length  $N$  equal to or larger than 4; determining whether the selected code length  $N$  equals  $2^m$ , where  $m$  is equal to or larger than 2; generating an orthogonal spreading code if  $N$  equals  $2^m$ ; selecting a code component length  $L_{\text{GUARD}}$  and an IFW length  $L_{\text{IFW}}$ ; determining whether  $L_{\text{GUARD}} \geq L_{\text{IFW}} \geq 0$  is true; selecting a new  $L_{\text{GUARD}}$  and  $L_{\text{IFW}}$  until  $L_{\text{GUARD}} \geq L_{\text{IFW}} \geq 0$  is true; calculating  $g$  based on  $2^{g-1} \leq L_{\text{IFW}} \leq 2^g$  if  $L_{\text{GUARD}} \geq L_{\text{IFW}} \geq 0$ ; setting  $k$  equal to 1, and  $j$  equal to 0; repeating adding  $k-1$   $2^{m-g} + j$  orthogonal spreading code to the  $k^{\text{th}}$  orthogonal code set and adding 1 to  $j$  until  $j > 2^{m-g} - 1$  is true; adding 1 to  $k$  if  $j > 2^{m-g} - 1$  is true; if  $k > 2^g$  is not true, repeat adding the  $2^{m-g} + j$  orthogonal spreading code to the  $k^{\text{th}}$  orthogonal code set and adding 1 to  $k$  until  $k > 2^g$  is true; and selecting one orthogonal code set from the generated orthogonal code sets as the representative orthogonal code set if  $k > 2^g$  is true.

10. Claims 23-24 & 26 are allowable.

Claims 22-24 & 26 are allowable over the prior art of record because the cited references do not contain the specified limitation of a method (and apparatus) of allocating code pairs using a representative orthogonal code set, comprising: determining whether orthogonal spreading codes are to be differently allocated to an I branch and a Q branch or to be similarly allocated to the I branch and the Q branch; if orthogonal spreading codes are to be differently allocated, determining

whether code pairs to minimize peak-to-average power ratio are to be allocated; if orthogonal spreading codes are to be differently allocated to an I branch and a Q branch, and are to be allocated to minimize peak-to-average power ratio, allocate orthogonal spreading codes by: arraying the elements of the orthogonal code set in an ascending order, wherein the ascending order comprises a first element, a center element, an element before center and a last element, pairing the first element with the center element, and pairing the element before center with the last element; if orthogonal spreading codes are to be differently allocated to an I branch and a Q branch and are not to be allocated to minimize peak-to-average power ratio, allocate orthogonal spreading codes by: arraying the elements of the orthogonal code set in an ascending order, wherein the ascending order comprises a first half of elements with a first element, a quarter-center element in the center of the first half of elements, and a last element, pairing the first element with the first element from the quarter-center element, and quarter-center with the last element; if the orthogonal spreading codes are to be similarly allocated to the I branch and the Q branch allocate orthogonal spreading codes by allocating code pairs in accordance with:

$L = \{l_0, l_1, \dots, l_2^{m-g-2}, l_2^{m-g-1}\}$  wherein a representative orthogonal code set is expressed as:

$$P = \{(l_0, l_2^{m-g-1}), (l_1, l_2^{m-g-1}), \dots, (l_2^{m-g-1}, l_2^{m-g-1})\}$$




***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (571)-272-3038. The examiner can normally be reached on M-F: 9am-6pm.

- If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (571)-272-3056
- The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.
- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sudhanshu C. Pathak

  
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